We claim:

1. An interferometer comprising:

a laser that produces a heterodyne beam;

a beam splitter positioned to split the heterodyne beam into a first beam and a second beam having different frequencies;

a first AOM in a path of the first beam, the first AOM operating to increase a difference between frequencies of the first and second beams; and

interferometer optics that generate measurement and reference beams from the first and second beams.

2. The interferometer of claim 1, further comprising a second AOM in a path of the second beam, the second AOM changing a frequency of the second beam.

3. The interferometer of claim 1, wherein the laser employs Zeeman splitting to provide in the heterodyne beam with a first component having a first frequency and a second component having a second frequency.

4. The interferometer of claim 3, further comprising an optical element in a path of the heterodyne beam, wherein in the heterodyne beam exiting the optical element, the first component has a first linear polarization and the second component has a second linear polarization that is orthogonal to the first linear polarization.

5. The interferometer of claim 4, wherein the beam splitter comprises a polarizing beam splitter that uses the first and second linear polarizations of the first and second components to separate the first and second components and split the heterodyne beam into the first and second beams.

6. The interferometer of claim 1, further comprising a beam-combining unit positioned to receive the first and second beams and provide a recombined heterodyne beam to the interferometer optics.

7. The interferometer of claim 6, wherein the beam-combining unit comprises:

a beam combiner;

a first optic cable assembly that carries the first beam to the beam-combining unit; and

a first manipulator on which the first fiber optic cable assembly is mounted, the first manipulator being adjustable to control a direction of the first beam upon exit from the first fiber optic cable assembly, wherein adjustment of the first manipulator controls an incident angle of the first beam on the beam combiner.

8. The interferometer of claim 7, wherein the beam-combining unit further comprises:

a second optic cable assembly that carries the second beam to the beam-combining unit; and

a second manipulator on which the second fiber optic cable assembly is mounted, the second manipulator being adjustable to control a direction of the second beam upon exit from the second fiber optic cable assembly, wherein adjustment of the second manipulator controls an incident angle of the second beam on the beam combiner.

9. The interferometer of claim 7, wherein the first manipulator is further adjustable to translate the first beam upon exit to control an incident location of the first beam on the beam combiner.

10. A beam-combining unit comprising:

a beam combiner;

a first optic cable assembly that carries a first beam to the beam-combining unit; and

a first mounting structure that holds the first fiber optic cable assembly so that the first beam upon exit from the first fiber optic cable assembly has a direction that directly controls an incident angle of the first beam on the beam combiner.

11. The beam-combining unit of claim 10, wherein the first mounting structure comprises a manipulator that is adjustable to control a direction of the first beam upon exit from the first fiber optic cable assembly, wherein adjustment of the first manipulator controls

an incident angle of the first beam on the beam combiner.

12. The interferometer of claim 11, wherein the first manipulator is further adjustable to translate the first beam upon exit to control an incident location of the first beam on the beam combiner.

13. The beam-combining unit of claim 10, wherein the first mounting structure provides for the first beam a fixed direction that controls the incident angle, the fixed direction being set during manufacturing of beam-combining unit.

14. The beam-combining unit of claim 10, wherein the beam-combining unit further comprises:

a second optic cable assembly that carries a second beam to the beam-combining unit; and

a second mounting structure that holds the second fiber optic cable assembly so that the second beam upon exit from the second fiber optic cable assembly has a direction that directly controls an incident angle of the second beam on the beam combiner.

15. The beam-combining unit of claim 10, wherein each of the first and second mounting structures comprises a manipulator that is adjustable to control a beam direction from the fiber optic cable assembly.

16. The beam combiner of claim 10, further comprising a window positioned to intercept the first beam, wherein adjustment of the widow translates the first beam to control an incident location of the first beam on the beam combiner.

17. A manipulator system comprising:

a first plate;

a first set of threaded devices, each having a spherical surface residing in a cavity on the first plate;

a second plate having a mounting area for an element being manipulated;

a second set of threaded devices, each having a spherical surface residing in a cavity on the second plate; and

a set of screws that attach the second plate to the first plate, each screw having first threaded portion engaged in one of the threaded devices in the first set and a second threaded portion engaged in one of the threaded devices in the second set.

18. The system of claim 17, wherein the first plate is fixed, and adjustment of the screws controls orientation of the second plate and an element mounted on the second plate.

19. The system of claim 18, wherein the set of screws consists of three screws that are position to control pitch and yaw of the second plate.

20. The system of claim 17, further comprising a fiber optic cable assembly attached to the mounting area of the second plate.

21. The system of claim 20, wherein the fiber optic assembly comprises:

a collimator; and

an optical fiber attached to the collimator.

22. A manipulator system comprising:

a first plate;

a second plate;

flexures that attach the first and second plate to prevent rotation of the first plate relative to the second plate, the flexures flexing to permit changes in separation between the first and second plates; and

actuators that attach the second plate to the first plate, the actuators being adjustable to control pitch and yaw of the second plate relative to the first plate.

23. The system of claim 22, further comprising a fiber optic cable assembly attached to a mounting area on the second plate.

24. The system of claim 23, wherein the set of screws comprises three screws symmetrically located around the fiber optic cable.

25. The system of claim 22, wherein the actuators comprise automated devices operable to change separations between the first and second plates in response to a signal.

26. The system of claim 22, wherein the actuators comprise screws operable to independently change separations at multiple points between the first and second plates.

27. The system of claim 26, wherein the screws engage threaded balls in contact with the first and second plates.

28. The system of claim 26, wherein the screws are differential screws having a first thread pitch engage with the threaded balls in contact with the first plate and a second thread pitch engage with the threaded balls in contact with the second plate.

29. The system of claim 26, wherein the screws are manually operable.